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## **(54) METHOD AND DEVICE FOR RECORDING AND REPRODUCING INFORMATION ITEM USING ROM-RAM STORAGE MEDIUM**

(57)Abstract:

PURPOSE: To increase an available storage capacity of a ROM-RAM storage medium by using the data items in place of the wobbling signals.

CONSTITUTION: As the information items can be recorded even on a non- wobbling-RAM information track formed in a magnetic domain D, data items existing in a ROM area of a ROM-RAM memory medium or on a ROM information track of a recording canter M are used for positioning a recording position and/or correlating the recorded or reproduced information with the rotating or proceeding speed of the canter M or a recording head. Then the information items recorded on the carrier M or a write signal RAM-WS and a write control unit RAM-WC are transmitted to the carrier M or stored in the carrier M via a write control unit RAM-WC or a write unit RAM-W. Then the data items existing in a ROM area of the carrier M are used for recording a write signal ROM-RS.

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## CLAIMS

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[Claim(s)]

[Claim 1] In record and the playback approach of the information item using a ROM-RAM storage The information item in the RAM field of a ROM-RAM storage Record of a (item) The information item memorized in the RAM field of carrying out using the data item (item) read from the ROM field of the ROM-RAM storage concerned, and/or the ROM-RAM storage concerned ( ) [ item ] Record and the playback approach of the information item using the ROM-RAM storage characterized by carrying out playback using the data item (item) read from the ROM field of the ROM-RAM storage concerned.

[Claim 2] The approach according to claim 1 which was made to enforce using the data item which recorded the information item in the RAM field of the ROM-RAM storage concerned on coincidence during read-out from the ROM field of the above-mentioned ROM-RAM storage, and was read to the coincidence of this \*\* again.

[Claim 3] The approach according to claim 1 or 2 of enforcing with the ROM-RAM storage which has the RAM code track which is in agreement with the ROM code track concerned in record and playback of an information item.

[Claim 4] At least, because of record of an information item, while to claims 1-3 using the data item which exists in the record location concerned in the ROM field of a ROM-RAM storage, it is an approach given in any 1 term.

[Claim 5] The above-mentioned ROM-RAM storage is an approach given in any 1 term, while to claims 1-4 using the data item contained in the ROM field of the ROM-RAM storage which is the magneto-optic-recording support (M) which has a pit (P) and the both sides of a magnetic domain (magnetic domain) (D), and is formed of a pit (P) at least for record of an information item.

[Claim 6] The above-mentioned ROM-RAM storage is an approach given in any 1 term, while to claims 1-5 used for control of the data item which are ROM/RAM disk and was simultaneously read from the RAM field of ROM/RAM disk during record of an information item at least of the rotational speed of the above-mentioned ROM/ROM disk.

[Claim 7] The ROM code track on which it was superimposed on the RAM code track concerned is an approach given in any 1 term, while to claims 1-6 which were made to perform the step using the data item which is used using a ROM-RAM storage for record of an information item, and/or playback, and is contained to the ROM field for [ for formation of correlation with record or playback, and a record carrier (M) concerned ] the decision of the location concerned with a record regenerative apparatus.

[Claim 8] The record and the regenerative apparatus which are characterized by having the RAM code track which has the course which is in agreement with a \*\*\*\*\* ROM code track in the above-mentioned ROM-RAM storage in record and the regenerative apparatus of an information item using a ROM-RAM storage, and being prepared since at least one record and a regenerative apparatus are records and playbacks of an information item.

[Claim 9] The above-mentioned ROM-RAM storage is the approach given in claim 8 term carried out as [ be / it / the disk form magneto-optic-recording support equipped with the spiral code track which has a pit (P) and the both sides of a magnetic domain (D) ].

[Claim 10] Record and a regenerative apparatus concerned are equipment according to claim 8 which has the means of the sake only for [ of the ROM signal (ROM-RS) memorized on the record carrier (M) ] playbacks because of [ for control of the speed of a record carrier (M) or a suitable record unit ] positioning (tab control specification) of a record location.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to record and the regenerative apparatus of an information item using a ROM-RAM storage.

[0002] That is, this invention relates to the approach and equipment which relate with the storage system which reads with a programmable read only memory and the so-called ROM, and has the so-called both sides of - write-in memory and RAM, and perform record and playback of an information item. The storage system concerned may be an optical storage system of the gestalt of a magneto-optic disk or a tape-like storage system, and may be constituted by the ROM-RAM storage system of other arbitration.

[0003] Generally it is common knowledge optical, magnetic, or to use an optical magnetic storage system because of record of an information item, and playback.

[0004] It has a hollow and the so-called pit all over the spiral truck showing the information item or data item memorized on the optical storage system, for example, this compact disk this CD usually called CD. those hollows -- CD top concerned -- or it should be embedded into CD and, as a result, the CD concerned should be assigned to the category of the retentive memory or a programmable read only memory. For playback of the information item memorized on CD called an optical disk, \*\*\*\*\* acceleration of the CD concerned is carried out in rotational speed, it is scanned by the light beam, and, thereby, the rate of a turntable is adjusted by the data signal included in the information

signal read from the disk. The disk concerned is scanned with a still higher rotational speed in the place near the center rather than it can set on an edge, in order to secure a fixed reading rate substantially in spite of the spiral configuration of a code track.

[0005] As memory which can perform selectable access freely, the magnetic storage system generally known as an audio or a videodisk is used as memory both for R/W. The place of record or the reproducing head is led to the magnetic tape which is an information carrier at a rate fixed in quality of self-. Furthermore, a magnetic tape which is used for the computer is known as a magnetic storage system. A data item is inserted in the magnetic disk for computers into the so-called sector (insertion).

[0006] In order to harness the advantage of a magnetic storage system (i.e., since the capacity which can always newly be written in can be used), it is well-known to use a magneto-optic-recording process in relation to the so-called MOD. It is possible to make the kind of disk perform multiplex elimination and record against record being performed depending on CD-WORM depending on MOD only once. The magneto-optic disk or MOD which does not have a crevice or a pit may be mostly eliminated and re-recorded by frequency with a request. The information item concerned is memorized and is read to the area (domain) which has the direction where magnetization differed with the light which polarized. A generation of correlation with record of an information item or playback, and the rotational speed of an optical disk sake, The approach and equipment of record of an information item and playback are well-known from DE-OS 2923581A1 (the Federal Republic of Germany patent application disclosure No. 29233581). In here, wobbling of the spiral code track is carried out during record of an information train towards intersecting perpendicularly and extending to it synchronizing with a synchronization signal (this synchronization signal setting a regular time interval, and being arranged in the information train) (\*\* carried out). \*(ing), a spiral code track appears as a wave-like line, and presents a substantial difference with the code track of CD in relation to this. Especially wobbling of the code track concerned is the need during record of an information item because of adjustment of the rotational speed of an optical disk. However, based on a \*\* wobble frequency, the demand which grows to the scan or regeneration system to which it shows light or a laser beam is imposed, and storage and playback are influenced [ inconvenient ]. In order to attain precise tracking using the easy tracking control loop in spite of the wobbling code track on a record carrier, The light-scanning equipment characterized by the following is well-known. spacing between the diffraction beams (this diffraction beam produces a tracking error signal) of the degree (order) of +1 on the record carrier concerned, and -1 -- the center frequency (this center frequency -- with, wobbling of the data tracks is carried out to the surroundings of the center position of that -- DE-OS3923 for example) concerned The light-scanning equipment characterized by attaining to the integral multiple of wavelength which belongs to 330A1 is well-known.

[0007] Since a wobbling signal is generated, decoding of this signal is carried out during the playback concerned, and the means for carrying out extract generation is required. Moreover, the recorded information signal also includes the clock signal with which it is used for reproductive control after tab control specification (positioning) of the playback location is carried out.

[0008] Furthermore, the well-known optical record carrier which has the clear layer shown in order to have increased the storage capacity of an information carrier expresses

the combination of CD and MOD, and is shown in DE-OS3732 875A1 (the Federal Republic of Germany patent application disclosure No. 3732875 official report). on the other hand, an information item or a data item is memorized in a pit, and, on the other hand, an information item may be memorized, and it is similar with MOD, and the magnetization layer of a light reflex MAG layer \*\*\*\* -- since frequency storage clearance of the arbitration may be carried out mostly, storage capacity 2-double-increases at least. With an optical scanner, for example, technique equipment given in DE-OS 3732874A1 (the Federal Republic of Germany patent application disclosure No. 3732874 official report), by advantageous technique, it is recorded thru/or read and a record carrier (this is also called a RO/AM disk or a ROM-RAM record medium) is obtained.

[0009]

[Objects of the Invention] Various places made into the object thru/or technical problem of this invention in this way are to make it increase to the capacity exceeding the capacity which can attain the available storage capacity of a ROM-RAM record medium from the sum of the process from which this \*\* differs variously, avoid the inconvenience caused by wobbling of a ROM code track, and reduce cost simultaneously with it in spite of different record and reconstructive processing.

[0010]

[Elements of the Invention] For implementation of the above-mentioned necessary function, for generation of correlation with the record from \*\*\*\*\* for determining a location especially (tab control specification being carried out) or playback, and a record carrier, fetch (extract) of the data item from the ROM field of a ROM-RAM storage is implemented with record and the regenerative apparatus of an information item (embodiment), and, thereby, the ROM-RAM record medium of this \*\* includes the RAM code track which has the course which is in agreement with a code track. That is, a RAM code track is overlaid by the ROM code track (piling up). Unlike the code track by which wobbling was carried out, wobbling transit in the direction which intersects perpendicularly to the direction of the track concerned thru/or a gap (deflection) in any way \*\*\*\*\*, It by which record and playback of an information item are enabled is a data item (this data item exists in the ROM field of a ROM-RAM record medium). it reads during record advantageously -- having -- it is because it is advantageously used instead of a wobbling signal in order to control the rotational speed of a record carrier especially and to position the location of the record concerned (tab control specification is carried out). The well-known approach and the equipment which are related with playback of the ROM storage concerned, en coating, and synchronization for this object may be used. additionally, the data item which exists in the ROM field concerned contributes to playback of the information item memorized to the RAM field -- it may be used like (it profits).

[0011] Although the magneto-optic disk (this has pit structure and a magnetic domain), for example, a RO/AM disk, is advantageously suitable as a ROM-RAM record medium, it is not limited to the type of the kind of record carrier, and can also be used for the shape of a tape, and an expensive record carrier. Record and playback of an information item are carried out with record and a regenerative apparatus which are carried out with the following records and regenerative apparatus, namely, scan and write in the ROM-RAM record medium (this is formed with the magneto-optic-recording object which has

a spiral code track advantageously) of this \*\*.

[0012] Record of the information item in a RAM field may be advantageously performed without wobbling by the activity of the data item which exists in a ROM field during record of an information item, and/or playback for control of a record medium, and, thereby, the inconvenience caused by wobbling is avoided. Different RAM and the different ROM information item which read and are memorized all over [ both ] one code track based on a technique \*\* that it may be reproduced by the scanner of one \*\* by that cause It from which the large storage capacity in comparison becomes available to the information or the data item which may be recorded on the RAM field concerned as compared with MOD is because it is not required to form the data item in a RAM field for the decision of a location and synchronization. Consequently, available storage capacity covers the sum of the storage capacity of the memory put together, and increases exceeding it. In addition, the cost which record and a regenerative apparatus take is because the means which needs it which is reduced for decoding of the wobbling signal over MOD is not needed. it points out -- it should have -- in the ROM field concerned, the RAM field concerned overlays this user storage region to the user-data item currently written in in the ROM field including a user storage region including the both sides of the data item of control and a user.

[0013] Next, this invention is explained using the example of a graphic display.

[0014]

[Example] the magnetic domain D by which the ROM-RAM record carrier M which is a ROM-RAM storage (this is formed with a magneto-optic disk) because of record of an information item and playback is used, and the above-mentioned magneto-optic disk is known in relation to the pits P and MOD known in relation to CD as an information carrier which carries out drawing 1 suitability -- having -- thereby -- it should observe -- the magnetic domain D is arranged in the direction which is in agreement with the code track of Pit P. Since an information item can be recorded in spite of the non-wobbling-RAM code track formed of a magnetic domain D, or it exists in the ROM field of a ROM-RAM storage, the data item which exists in the ROM code track of a record carrier is used for generation of correlation between the rotational speed of record or playback \*\*\*\*\* information, a record carrier, or a recording head, or the speed of advance in order to position a record location (grade assignment). The code track concerned can exclude the data about positional information, and the data about synchronization selectively or thoroughly at least selectively, and, as a result, generation of additional storage capacity of it is enabled contrastively. A part is chiefly prepared very much for the self-synchronization of a RAM storage region needed during playback of a RAM signal.

[0015] Furthermore, the cost (the block diagram of the above-mentioned equipment is shown in drawing 2 ) to the equipment for record of an information item and playback is reduced. A ROM-RAM storage or a record carrier M is driven by the actuation function SPM, and this SPM is controlled by the speed regulating device SPC. The control signal over a speed regulating device SPC is chiefly drawn from ROM signal ROM-RS, and this ROM-RS is detected by the scan unit R from a record carrier M. From the scan unit R, ROM signal ROM-RS and RAM signal RAM-RS are sent out, and these signals are supplied to alien-system OS through the signal-processing back SCD, when required.

[0016] A record \*\*\*\*\* information item or write-in signal RAM-WS is transmitted

through write-in unit RAM-W through write control unit RAM-WC at a record carrier M on a record carrier M, or it memorizes on a record carrier M. The data item (the above-mentioned ROM field is formed as a ROM-RAM storage) which exists in the ROM field of a record carrier like [ it is \*\*\*\*\* and ] is used from the block diagram of drawing 2 for record of write-in signal ROM-RS, expensive speed regulation required for MOD record and a regenerative apparatus already becomes application needlessness by that cause, and, as a result, cost is reduced remarkably. This becomes possible at the especially following points, namely, a data item becomes possible at the point which may be simultaneously read from a record carrier during record. Eternally, available ROM signal ROM-RS is used as a controlled variable to the rotational speed of a record carrier M, and the current position of the relative scan unit R may be drawn from ROM signal ROM-RS by the well-known technique to a record carrier M.

[0017] Record and playback of an information item are explained using the basic conceptual diagram of drawing 3 . For record of the information item on a record carrier M (this is the ROM-RAM storage of the gestalt of the magneto-optic disk which has Pit P and the both sides of a magnetic domain D in a code track), the coil W which generates a field is supplied, and the direction of magnetization of the magnetic domain D arranged at the magnetic layer of a record carrier M depending on the above-mentioned field is influenced, or the item or write-in signal RAM-WS of record \*\*\*\*\* information changes. A magnetic layer is heated by the laser beam generated by the laser diode LD beyond the curie temperature of a magnetic layer for this object. The direction of the magnetization determined by the field of Coil W as a result is maintained by the record carrier M after cooling below at the curie temperature of this \*\*, and the information concerned is memorized from a record carrier M. For heating of a magnetic layer, a laser diode LD is controlled by the system control section SC through a laser driver LDD, every time it takes the post of this, it is explained only about the point which has relation chiefly, and it is not mentioned by the detailed role. Temperature required for heating of a magnetic layer is made to be generated with the focus of a laser beam using a collimate lens CL and objective lens OL on a record carrier M. A ROM signal (this is read from a record carrier M during record again) is used for [ for control of a record middle turn rate ] the decision of the location of record, this ROM signal is detected using the laser or the light beam generated by the laser diode LD, and a beam splitter HM is used in here with the 1st polarization beam splitter PBS 1 stationed in the path of the laser beam concerned, and the 2nd convex lens valve flow coefficient2. ROM signal ROM-RS detected by photo diode PD 3 is processed by the information signal by the current-electrical-potential-difference converter A1 (this information signal may be processed further), or may be processed by actual ROM signal ROM signal ROM-RS1.

[0018] Above-mentioned ROM signal ROM-RS1 (this contains the information item about the rotational speed and the current position of a record carrier again) is supplied to a speed regulating device SPC through a switch S1, and this equipment SPC supplies control voltage required for a necessary rotational speed of a record carrier M to the data table motor SPM. ROM signal ROM-RS -1 detected from the record carrier M is used following this for record of the information item on a ROM-RAM storage or a record carrier M. A switch S2 is advantageously set in the open condition in the mode of operation concerned, and the information item memorized on the ROM truck of a record carrier M may be reproduced during record for processing of this \*\* of consecutiveness

of ROM signal ROM-RS -1 (though the RAM code track concerned and a ROM code track \*\*\*\* in drawing 1 and it is superimposed on them).

[0019] It which is not required for additional effect impression (control action) of RAM signal SPM-WS, and does not produce the inconvenience accompanying it as a result and by which the cost usually needed for control of a record carrier M for record of RAM signal RAM-WS (it becomes necessary if it does not do so) is avoided is because the means established for the information item memorized in Pit P or ROM signal regeneration may be used advantageously. Since RAM signal RAM-WS comes to need additional auxiliary information for [ for positioning (tab control specification) of a record location ] control of a rate, additional storage (memory) capacity space becomes available.

[0020] Some modes of operation are possible about playback of the information item recorded on a ROM-RAM storage.

[0021] For example, in order to prevent destruction of the information [ to which this may be carried out by the above technique when the information item memorized to Pit P or the ROM field should be reproduced selectively ] item which a laser beam or a laser diode LD is controlled as follows by that cause, namely, has probably already been memorized to the RAM field, a magnetic layer is not heated, and it makes, and is controlled.

[0022] To a RAM field, chiefly Or in order to reproduce only the information item memorized by the magnetic domain D, The light which polarized uses and \*\* by the well-known technique. All over the beam way of a laser beam A collimator lens CL Between the 1st gamma/2 plate P1 and above-mentioned 1st polarization beam splitter PBS1 which have been arranged between 1st polarization beam splitter PBS1, and the 2nd convex lens valve flow coefficient2 Arranged 2nd polarization beam splitter PBS2, the 2nd gamma/2 plate P2, 3rd polarization beam splitter PBS3, 1st convex lens valve flow coefficient1, 3rd convex lens valve flow coefficient3, and the 1st and 2nd photo diode PD1 and PD2 are formed.

[0023] The RAM signal read from a record carrier M appears as a difference signal of the signal concerned detected by the 1st and 2nd photo diode PD1 and PD2 in that case. In this mode of operation, a switch S2 is closed, control of a record carrier M is performed by ROM signal ROM-RS2, and this ROM signal is tapped and taken out between a laser driver LDD and a laser diode LD, and it a speed regulating device SPC is not only supplied, but may be used through a switch S1 as a RAM signal and terminal (signal) ROM-RS2 suitable for playback in juxtaposition (sent out). In the mode of operation concerned, a laser driver LDD or a laser diode LD is controlled by the detected adjustment signal through a servo amplifier A2 by the switch S2, the capacitor C1 and the current-electrical-potential-difference converter A1, and photo diode PD 3. Thereby, the above-mentioned capacitor C1 is formed in order to carry out separation cutoff of the dc component of the adjustment signal concerned.

[0024] it is prepared during the configuration of drawing 3 -- cylindrical -- ZL and especially the photo diode PD 4 are formed for the tracking of a scanning beam, and focusing. Although the record playback approach and equipment of an information item have been explained based on the ROM-RAM storage complex of the gestalt of the magneto-optic disk with a spiral code track which has Pit P and a magnetic domain D above, this invention is not restricted to the record carrier of the kind of type.

[0025]

[Effect of the Invention] Expensive \*\*\*\*\* that it is made to increase to the capacity exceeding the capacity which can attain the available storage capacity of a ROM-Pulse Amplitude Modulation storage from the sum of the process from which this \*\* differs variously, the inconvenience caused by wobbling of a ROM code track is avoided, and cost may be simultaneously reduced with it in spite of record which is variously different according to this invention, and reconstructive processing.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the schematic diagram showing the code track of a ROM-RAM storage.

[Drawing 2] They are record and the block connection diagram of a regenerative apparatus.

[Drawing 3] They are record of an information item, and the basic block diagram of a regenerative apparatus.

[Description of Notations]

P Pit

D Magnetic domain

R Scan unit

SCD After signal processing

M Record carrier

W Coil

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